Universitat de Lleida

DEGREE CURRICULUM
STATISTICS AND COMPUTER SCIENCE

Coordination: ESCOLA AGUSTI, ALEXANDRE

Academic year 2023-24

STATISTICS AND COMPUTER SCIENCE 2023-24

Subject's general information

Subject name	STATISTICS AND COMPUTER SCIENCE
Code	102523
Semester	1st Q(SEMESTER) CONTINUED EVALUATION

Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Agricultural and Food Engineering	2	COMMON/CORE	Attendance-based

Course number of credits (ECTS)	6

Type of activity, credits, and groups	Activity type	PRALAB	PRAULA	TEORIA
	Number of credits	2.4	0.8	2.8
	Number of groups	2	2	1

Coordination	ESCOLA AGUSTI, ALEXANDRE
Department	AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING
Teaching load distribution between lectures and independent student work	Each credit or ECTS is equivalent to 25 hours of student work, 10 of which are face-to-face (i.e., student-teacher activities) and the remaining 15 hours are self-employed.
Important information on data processing	Consult this link for more information.
Language	Catalan and Castilian
Distribution of credits	The subject is divided into 2 blocks: Block 1 - Computer Science and Block 2 - Statistics.

In Block 1 there will be 1.6 theoretical ECTS and 2.4 ECTS of practice in computer room.

In Block 2 there will be 1.6 theoretical ECTS and 0.4 ECTS of practical exercises in the classroom. |

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
COLOMER CUGAT, MA. ANGELES	mariangels.colomer@udl.cat	2,8	
ESCOLA AGUSTI, ALEXANDRE	alex.escola@udl.cat	2,2	
LLORENS CALVERAS, JORDI	jordi.llorens@udl.cat	1	
TORRENT MARTI, XAVIER	xavier.torrent@udl.cat	3,2	

Subject's extra information

Subject / subject in the curriculum

The subject, Statistics and Computer Science belongs to Module I, of basic training, of the title of Degree in Agricultural and Alimentary Engineering and covers two differentiated fields of knowledge: (1) the technologies of the information applied to the field of Agricultural Engineering and Food (ICT) and (2) that of statistics. The course is taught in the second year in order to provide students with basic and applied knowledge that will become tools to support both the development of other subjects of the Degree and future professional development.

Computer skills are the set of knowledge, skills, and abilities that enable students to know the basics and operation of Information and Communication Technologies (ICT), their professional applications and how they can be used to achieve specific goals. To achieve these skills, two complementary pathways are used: (1) the subject of "Statistics and Computer Science" where 4 ECTS are dedicated to this area of knowledge and (2) the deepening and extension of these contents in other subjects of the curriculum.

Learning objectives

The student, upon passing the subject, must be able to:

Block 1 .- Computer science:

- Understand and demonstrate knowledge about the technological bases of ICT and their application and use in the field of agricultural engineering.
- Understand and demonstrate basic knowledge of computer equipment and methods applied to agricultural engineering.
- Create complex text documents.
- Create complex spreadsheets.

Block 2 .- Statistics:

- Understand and know the statistical tools necessary to solve basic problems in the agricultural field.

- Know how to design and plan data collection in real problems

Competences

Basic skills:

CB1. That students have demonstrated that they possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge from the forefront of your field of study.

CB2. That students know how to apply their knowledge to their work or vocation in a professional way and possess the competencies that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

CB3. That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues of a social, scientific or ethical nature

CB4. That students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences

General competences:

CG7. Knowledge of basic, scientific and technological subjects that allow continuous learning, as well as an ability to adapt to new situations or changing environments.

CG8. Ability to solve problems with creativity, initiative, methodology and critical reasoning.

CG12. Ability to work in multidisciplinary and multicultural teams.

CG13. Correction in oral and written expression

CG15. Mastery of Information and Communication Technologies

CG16. Respect for the fundamental rights of equality between men and women, the promotion of Human Rights and the values of a culture of peace and democratic values

Specific skills:

CEFB1. Ability to solve mathematical problems that may arise in engineering. Ability to apply knowledge about: linear algebra; geometry; differential geometry; differential and integral calculus; differential equations and partial derivatives; numerical methods, numerical algorithmic; statistics and optimization.

CEFB3. Basic knowledge about the use and programming of computers, operating systems, databases and computer programs with applications in engineering.

Subject contents

BLOCK 1: COMPUTER SCIENCE

THEORETICAL CONTENTS

Unit 1. Introduction to information and communication technologies (ICT) and computer science

Computers and computer systems. Use of ICT in agricultural engineering.

Unit 2. Technological bases of ICT (I) and computing

Digital technology. Logic circuits. Computers and computer systems. Data and coding systems.

Unit 3. Technological bases of ICT (II) and computing

Equipment and components of computer systems.

PRACTICAL CONTENTS

- **Practice 1. Advanced text editing (5 sessions)**
- **Practice 2. Advanced spreadsheet editing (5 sessions)**
- **Practice 3. Bases of structured programming (2 sessions)**

BLOCK 2: STATISTICS

THEORETICAL CONTENTS

Unit 1. Introduction to statistical inference

Unit 2. Confidence intervals

Unit 3. Hypothesis testing

Unit 4. Introduction to computer models. An application with Population Dynamic P System models.

PRACTICAL CONTENTS

- **Practice 1. Resolution of a practical case of hypothesis tests and confidence intervals. (2 hours).**
- **Practice 2. Resolution of a practical case of analysis of variance of more than one factor. (2 hours).**

Methodology

Block 1. Computers

The theoretical contents will be taught in the format of participatory master class, in big group.

The practice sessions, either in the classroom or in the computer room, will be taught spliting the group in two medium groups in order to facilitate participation and interaction with the teacher.

Block 2. Statistics

Theoretical and practical classes. The theoretical contents will be explained and exercises will be solved using the classic tools, in order to be able to control and interpret the results that the statistical packages give us.

The R program will be taught with which students will have to solve a series of cases.

Development plan

The subject planning will follow the official timetables issued by the Direcció d'Estudis. They are available at the website of the degree GEAA.

Evaluation

The evaluation of the subject will be organized by blocks. Block 1, Computing, represents 66% of the final mark and Block 2, Statistics, represents 34% of the final mark. The default assessment is continuous assessment.

In order to pass the subject, you must obtain, at least, a grade corresponding to 40% of the maximum score for each block. If this grade is not obtained after the corresponding retakes, the final grade for the subject cannot be higher than 4.9 points out of 10 and, therefore, the subject cannot be passed.

BLOCK 1 - Computer sciences has a weight of 66 % in the final grade and is assessed through the following activities:

- Theoretical-practical exam that will include the theoretical content of the subject and part of the practical content. The exam will have a weight of 30 % on the final mark of the subject. In order to pass the subject, you must have a grade of at least 4 points out of 10 in the exam. If the exam is failed (grade under 5 points out of 10) the student can take a make-up exam. The exam and its corresponding recovery will take place on the days assigned to the degree's official calendar by the director of studies, which can be consulted on the GEAA website.
- A work in pairs that will serve to evaluate the practical sessions of advanced text editing. This work will have a weight of 20 % on the final mark of the subject. In order to pass the subject, you must have a grade of at least 4 points out of 10 for the work. If the work does not reach the score of 5 points, the student may present a remedial work, the grade of which cannot exceed 6 points out of 10.
- Exercises and practical activities corresponding to the practical sessions on advanced editing of spreadsheets and structured programming. This section will have a weight of 16% on the final mark of the subject. In order to pass the subject, you must have a grade of at least 4 points out of 10 obtained from the arithmetic mean of all the exercises presented within this activity. Students who do not pass this activity may take a practical exam in the computer room. In this case, the grade obtained in this activity cannot exceed 6 points out of 10.

Attendance at the various practical sessions of Block 1 is not mandatory but exercices on advanced spreadsheet editing and structured programming must be presented on time. However, an attendance check will be carried out for the practical sessions and the teaching staff reserves the right to summon students who have not attended certain sessions in order to explain orally, with the corresponding computer support, how they have solved the practices that he has not attended. In these cases, the grade for the practices that the student did not attend will be provisional (as long as he submitted it within the deadline established for all students) until it is validated after the oral session. Once the oral session has been completed, the grade can be confirmed or lowered according to the faculty's discretion.

BLOCK 2- Statistics has a weight of 34 % and will be assessed through the following activities:

- There will be 2 types of evaluation activities: the activities (solving 2 practical cases), which have a weight of 20 % of the total of Block 2 (statistics part) and the exam, which has a weight of 80 % of the total of Block 2 (statistics part). Only the exam can be retaken.
- The exam can consist of only one part (written part without computer) or two parts (written part without computer and practical part with computer). If the exam consists of two parts, each part will have equal weight. In this case, a minimum grade of 3 points out of 10 must be obtained in the written part. If this score is not reached, the practical part will not be corrected and the final mark will be only that of the theoretical part.

	Weight over Block 2 (statistics)	Weight over the total (34%)
Activitaties	20 %	6.8 %
Examen	80 %	27.2 %

General observations

- In accordance with the current regulations, if any student cannot follow the continuous evaluation for any justifiable reason, it is necessary to communicate this to the Directorate of Studies of the ETSEA and

request the alternative evaluation procedure officially within of the established term. The alternative assessment request is subject to the assessment regulations and has a specific procedure. Students who request continuous assessment will be assessed with the following activities:

- A Block 1 exam at the end of the semester on the date set by the Directorate of Studies which will have a weight of 46 % on the final grade;
- A work on text editing, the same as that required of continuous assessment students with a weight of 20 % on the final grade;
- A Block 2 exam at the end of the semester on the date set by the Directorate of Studies which will have a weight of 34 % on the final grade
- The resit of these activities will have the same conditions as the continuous assessment students.

- In order to be able to make a fair assessment for all students, plagiarism in the delivered activities will be meticulously pursued. Any plagiarized activity will count 0 points in the assessment.

Bibliography

BASIC BIBLIOGRAPHY

Block 1 - Computer science

- MINGUET, J. M. i READ, T. Informática fundamental. Ed. Universitaria Ramón Areces.
- SERRA, M. i BAÑERES, D. (coordinadors). Fonaments de computadors. UOC.
- Manuals de MSWord, MSExcel i de RStudio diversos.

Block 2 - Statistics

- CANAVOS, C. George. Probabilidad y Estadística. Aplicaciones y métodos. Mc Graw Hill, 1992.
- COLOMER C, MªÀ. Curs d'estadística. Problemes. Edicions de la Universitat de Lleida i F.V. libros, 1999.

Supplementary bibliography

- PRIETO ESPINOSA, A. LLORIS, ANTONIO. Introducción a la Informática. McGraw-Hill, 2006
- ARANDA, M. C. i altres. Fundamentos de informática. Universidad de Málaga.
- GARCÍA PÉREZ, A. Estadística Aplicada: conceptos básicos. Universdad Nacional de Educación a distancia, 1992.
- MONTGOMERY. D.C., i RUNGER, G. Probabilidad y Estadística. Aplicadas a la Ingeniería. Mc Graw Hill,1996